Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

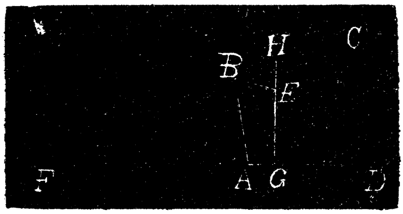
JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

31. Proposed by Professor G. I. HOPKINS, Manchester, New Hampshire.

A field is bounded as follows: N. 14° W. 15.2 chains; N. 70° 30′ E. 20.43 chains; S. 6° E. 22.79 chains; N. 86° 30′ W. 18 chains. A spring within it bears from the second corner S. 75° E. 7.9 chains. It is required to cut off 10 acres from the west side of the field by a straight fence through the spring. How far will it be from the first corner to the point at which the division fence meets the fourth side?

Solution by Wm. B. TIMMANS, Professor of Mathematics, St. Mary's College, St. Mary's, Ky.

Let CB and DA be extended to F, and E joined with F.



The bearings give the angles as follows: $ABF=84^\circ\ 30'$; $BAF=72^\circ\ 30'$; $AFB=23^\circ$; $EBF=145^\circ\ 30'$.

I find $AF=38.722$; $BF=37.101$; and twice area of $ABF=561.34$ sq. ch. In $\triangle\ EBF$ we have two sides and the included angle; from which I find $EF=43.8411$ ch.; the angle $BFE=5^\circ\ 51'\ 29''$, and the angle $EFG=17^\circ\ 08'\ 31''$.

Let GH be the required line; and call $FH=x$, and $FG=y$.

Hence, we have $xy\sin 23^\circ=561.34+200.=761.34=$twice area GFH....(1).
$43.8411\,x\sin 5^\circ\ 51'\ 29''+43.8411\,y\sin 17^\circ\ 08'\ 31''=761.34=$twice area GFH....(2).

From (1) $xy=\dfrac{761.34}{\sin 23^\circ}=1949.398$, and $x=\dfrac{1949.398}{y}$....(3).

Substituting in (2) and reducing, I get $y^2-58.946\ y=-675.0486$,
$y^2-58.946\ y+(29.473)^2=-675.0486+868.672=193.6234$,

$\cdot\ y-29.473=\pm 13.9148$.

Using the *plus* sign (the *minus* sign cannot be used, as it would make G fall to the *left* of A), we have $y=FG=43.3878$; and $AG=4.6658$. *Ans.*

I find $BH=7.828$; $GH=17.672$; $FGH=83^\circ\ 24'\ 09''$; $FHG=73^\circ\ 35'\ 51''$.

Hence the *ten acre lot* is bounded as follows:

N 14° W.	15.20 ch.
N 70½ E.	7.828
S 3° 05′ 51″ E.	17.672
N 86½ W.	4.6658.

Solutions to this problem were received from *G. B. M. Zerr, William E. Kern, H. C. Whitaker, P. H. Philbrick, J. M. Colaw, and A. H Bell.*

PROBLEMS.

---

35. Proposed by LEONARD E. DICKSON, M. A., Fellow in Mathematics, The University of Chicago.

Determine the equation of lowest degree (cubic) upon which depends the inscription of the regular polygon of 37 sides.

38. Proposed by O. W. ANTHONY, Mexico, Missouri.

From two points, one on each of the opposite sides of a parallelogram, lines are drawn to the opposite vertices. Through the points of intersection of these lines a line is drawn. Prove that it divides the parallelogram into two equal parts.

CALCULUS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS TO PROBLEMS.

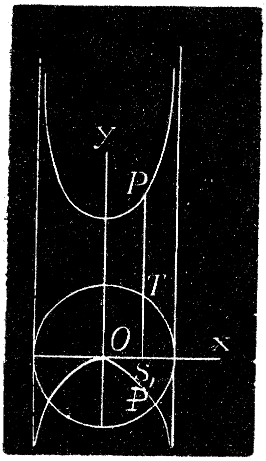
18. Proposed by J. M. BANDY, A. M., Principal of High School, Ashboro, North Caolina.

If the ordinate ST of any point T on a circle

$$x^2+y^2=r^2$$

be produced so that $ST.TP=r^2$, prove that the whole area between the locus of P and its asymptotes is double the area of the circle.

III. Solution by ALFRED HUME, C. E., D. Sc., Professor of Mathematics, University of Mississippi, University, Mississippi.



If the ordinate is produced in both directions (upward and downward) there will be two points, P and P_1, located for every point, T, on the circle; and when T has moved over the upper half of the circle, P has traced the upper, and P_1, the lower curve.

x and y being the co-ordinates of P, $ST=\sqrt{(r^2-x^2)}$.

For the upper curve, $TP=y-\sqrt{(r^2-x^2)}$, and the equation is $y_1=\dfrac{2r^2-x^2}{\sqrt{(r^2-x^2)}}$, y_1 being always positive.

For the lower curve, $TP_1=y_1+\sqrt{(r^2-x^2)}$, and the equation is $y_1=\dfrac{x^2}{\sqrt{(r^2-x^2)}}$, y_1 being always negativ.

Therefore the length of $PP_1(=PS+SP_1=y+y_1)$ is $\dfrac{2r^2}{\sqrt{(r^2-x^2)}}$.

Total area between the curves and two common asymptotes $(x=\pm r)$ $=2\displaystyle\int_0^r\frac{2r^2dx}{\sqrt{(r^2-x^2)}}=\Big[4r^2\sin^{-1}\frac{x}{r}\Big]_0^r=2\pi r^2$.

[The solutions previously published supposed an alteration to be made in the original statement of the problem. Prof. Hume thinks possibly the Proposer had the above in mind. We publish for comparison.—EDITOR.]